

**TUBULAR ENERGY MANAGEMENT SYSTEM FOR**  
**ABSORBING IMPACT ENERGY**

**ABSTRACT**

An energy-absorbing system includes a tube made of a continuous material, such as  
5 heat-treatable steel. The tube has first and second ring sections connected by an intermediate  
section. In one aspect, the intermediate section is flared and/or pinched to cause one tube  
section to predictably telescopingly roll upon impact. In another aspect, one section is  
annealed to optimize elongation and yield properties to facilitate rolling upon impact. By this  
arrangement, upon the bumper system receiving a longitudinal impact, the first and second  
10 ring sections telescopingly collapse with a predictable and consistent rolling collapse. Methods  
related to the above are also disclosed.